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(54) Chocolate fillings containing anti-bloom additive.

(57) The presence of a specific (H_2M + HM_2)-fat, either in the filling or in the coating of encapsulated fillings, results in the retardation of bloom of the chocolate composition. Therefore, the invention is concerned with encapsulated fillings, wherein the coatings display a defined (H_2M + HM_2)-content. A process of preparing these encapsulated products is also disclosed. Encapsulated products are, e.g., chocolates, pralines, biscuits, cookies, toffees, fried snacks or cakes.

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Chocolate-encapsulated fillings consisting of at least a filling and a chocolate coating, wherein the filling comprises conventional filling ingredients, such as sugar, skimmed milk powder, salt or emulsifier and at least 35 wt.% of a filling fat, are well-known products. So far, however, these products have displayed a big disadvantage, in particular when the filling is liquid, i.e. fat present in the liquid filling migrates into the coating layer. Because of this migration, blooming of the chocolate occurs.

In order to overcome this problem, a solution was sought in the use of an intermediate layer between the liquid filling and the coating. However, such an extra layer complicates the production process and often has a negative influence on the mouthfeel of the product.

Therefore, we have conducted a study in order to find out whether it is possible to avoid the necessity of such an extra layer while the product properties are as good or even better.

Prior Art

From US 2,979,401 stabilizing ingredients for solid chocolate materials or chocolate-coated products are known that are included in the chocolate in amounts of 0.5-5 wt.%. The stabilizing ingredients consist of triglycerides of lauric, myristic and palmitic acid, preferably in molar ratios of 2.0 : 1.2 : 2.0. Minor amounts of other fatty acids do not change the basic character of the ingredients. The ingredients are used to stabilize the colour of chocolate upon storage. Because of the very strict requirements set to the fatty acid components of the triglycerides that may be used, these products have never been applied commercially.

From US 3,491,677 it is further known that bloom formation can be inhibited by utilization of fatty compositions that are mixtures of natural interesterified triglycerides comprising short-chain fatty acids and long-chain fatty acids while the iodine value (= I.V.) of the compounds is 30-55 and the melting point is low. As a consequence of the above-mentioned requirements, only a limited range of triglycerides could be applied while the low melting point may create problems as regards the properties of the chocolate composition.

From EP 394,408 triglyceride compositions are known that contain high levels (at least 85%) of combined MLM and MML (M = saturated fatty acid C_8-C_{10}; L = saturated fatty acid C_{20}-C_{24}) and low levels (i.e. at most 10 wt.%) of triglycerides LLM and LML (combined). These fats should always contain C_8 and C_{10} fatty acid residues (35-60 wt.%) in a ratio of 1:4 to 4:1, while also 35-60 wt.% of behenic acid should be present. Minor amounts of C_{12}-C_{18} fatty acids can be present in the fats.

The fat phase comprising the above-mentioned triglycerides should contain less than 20 wt.% of cocoa butter (i.e. less than 15 wt.% of SUS; S = saturated C_{16}/C_{18}; U = oleic). The triglycerides are applied in order to reduce the caloric value of compositions normally containing cocoa butter by replacing cocoa butter by these mixed triglycerides.

The Invention

We have now found that the problems associated with the application of the prior art products can be solved by using a specific hardstock fat in the encapsulated filling.

Therefore, our invention is concerned with chocolate-encapsulated fillings consisting of at least a filling and a chocolate coating, wherein the filling comprises conventional filling ingredients and at least some amount, preferably at least 10 wt.%, more preferably at least 35 wt.%, of a filling fat, including optionally hardstock components, which products are characterized by the presence of such an amount of an (H_2M + HM_2)-fat having a stearic acid content of at least 5 wt.% and preferably having an iodine value of less than 20 as hardstock in the encapsulated product that the coatings display an (H_2M + HM_2)-content after storage for 10 weeks at 20 °C of at least 0.5 wt.% and an SOS content of at least 15 wt.%, in which :

- H means saturated fatty acid with ≧ C_{16}, preferably C_{16}/C_{18};
- M means saturated fatty acid with C_8/C_{14}, preferably C_{12}-C_{14};
- S means saturated fatty acid with C_{16}/C_{18};
- O means oleic acid.

The stearic acid content of the hardstock is preferably at least 20 wt.% and its iodine value is preferably less than 5.0.

The above-mentioned requirement of at least 0.5% (H_2M + HM_2) in the coating after storage for 10 weeks at 20 °C can be fulfilled in two ways :

Firstly, lauric fat (= HM_2 + H_2M fat) can be added to the chocolate composition that is used for the coating.

Secondly, this lauric fat can be added to the filling as part of the fat phase of the filling.

Upon storage, the lauric fat migrates from the filling into the coating where it affects its bloom-retarding

effect.

It should be emphasized here that the storage requirement of 10 weeks at 20°C is a minimum requirement, meaning that, in addition to this storage, any other treatment, such as storage at other temperatures, is permitted.

In both cases, products are obtained that have an increased resistance to blooming. An additional benefit of the presence of the hardstocks might be that it might prevent the migration of other fats from the more liquid part of the composition.

Suitable fillings that can be encapsulated are chocolate fillings, praline fillings, biscuits, cookies, toffees, fried food products, cakes etc. All these fillings contain some fat; however, preferred amounts are at least 10 wt.%, and in particular at least 35 wt.%, of a filling fat.

The best results are obtained when the (H_2M + HM_2) content in the coating after 10 weeks' storage at 20°C is at least 0.6 wt.%, preferably 0.6-1.2 wt.%.

As has been set out above, the (H_2M + HM_2)-containing hardstock can be part of the fat phase of the filling, in which case its concentration is at least 0.5 wt.%, preferably 0.5-25 wt.% (based on the filling), or it can be part of the coating, in which case its concentration is at least 0.5 wt.%, based on the total coating. Of course, it is also possible to distribute the hard fat over the filling and the coating.

As hard fat component containing (H_2M + HM_2), interesterified mixtures of vegetable oils high in triglycerides with fatty acid residues with at least 16 C atoms but containing at least 5 wt.% of stearic acid and triglycerides rich in lauric and/or myristic acid residues can be used advantageously. Examples of such fat mixtures are mentioned in, e.g., our Australian patent application 12346/83, Ser. Nr. 549,465.

In particular, interesterified mixtures of hardened palm oil and hardened palm kernel oil, such as an interesterified mixture of PO-58 and PK-olein-42, are very suitable. Fractions of these products can also be used. For instance, the olein fraction of the wet fractionation of such an interesterified fat mixture also gives very satisfactory results.

The chocolate coating can be made of any kind of chocolate composition. So, plain chocolate and milk chocolate can both be used. The chocolate can also contain other ingredients, such as flavour, fruit components etc.

The filling can be chosen from the normal fillings that can be coated with a chocolate layer. Examples of such fillings are fillings for chocolates, bonbons or pralines, toffee fillings containing toffee fat, biscuits containing biscuit cream fat, roast nuts, such as roast hazelnuts or penauts. However, cookies, fried food products, such as fried snacks, cakes etc. that are coated with a chocolate layer can also be considered as a filling.

A very convenient way to produce, e.g., chocolate-coated cookies or biscuits is by incorporating a (H_2M + HM_2) hardstock in a margarine or a shortening in order to use this fat composition for the baking of a product that can be enrobed with chocolate, whereupon the lauric fat migrates from the filling to the coating. The fried food products can advantageously be made by frying the food products in a frying oil containing the lauric fat and enrobing the fried products with chocolate, e.g. by dipping them in a liquid chocolate bath.

The invention also concerns a process for the production of the encapsulated fillings. The products are made in a conventional way; however, the (H_2M + HM_2)-containing hardstock is incorporated into the filling as part of the filling fat, whereupon the end products are obtained upon storage, during which the lauric fat component migrates to the coating.

It is, of course, also possible to add the lauric fat immediately to the chocolate composition from which the coating is made. However, this might give rise to problems with the viscosity or the melting behaviour of the chocolate composition.

Furthermore, our invention is concerned with the use of the lauric fat compositions in order to achieve retardation of bloom of the chocolate coating. In particular, the invention concerns the use of the lauric hardstock as component of the fat of fillings to be coated in order to achieve a migration of the lauric component to the chocolate coating upon storage.

The invention will now be illustrated by the following non-limiting Examples.

EXAMPLES

I. Three different fillings were made with the composition as mentioned in Tables 1 and 2.

TABLE 1

	wt.%
Peanut	59.1
Icing sugar	20.4
S.M.P.	3.0
Salt	0.5
Lecithin	0.5
Groundnut oil	7.5
Hardstock	10.0
Total fat	50.0%
% Hardstock on fat	20.0%

TABLE 2

Carbon number	Composition		
	HS-1	HS-2	HS-3
C40			0.9
C42			2.5
C44			2.8
C46	0.2	0.1	4.1
C48	0.8	0.1	4.3
C50	10.2	2.8	4.3
C52	27.1	20.8.	21.0
C54	46.5	60.3	44.0
C56	6.5	7.3	6.0
C58	5.6	5.7	4.5
C60	2.7	2.8	2.1

HS-1 being a stearin fraction of the fractionation of a trans-hardened, interesterified mixture of soybean oil and palm oil olein.

HS-2 being a shea stearin fraction.

HS-3 being a fat having a content (H_2M + HM_2) of about 70 wt.%, a carbon number distribution of C_{30}-C_{38} : 4.1%; C_{40} : 4.1%; C_{42} : 9.8%; C_{44} : 12.5%; C_{46} : 21.4%; C_{48} : 23.0%; C_{50} : 10.6%; C_{52} : 9.0%; and C_{54} : 5.3%, while the FAME of this product was: C_{12} : 20.1%; C_{14} : 8.1%; C_{16} : 23.7%; C_{18} : 44.3%; $C_{18:1}$: 0.4%; $C_{18:2}$: 0.4% and others 3.0%. Its I.V. was 1.

The fillings were placed in dark chocolate coatings and stored at 20 ° C and 23 ° C.
The carbon number analysis of the fat phase from the coatings was :

	wt.%
C48	0.5
C50	18.0
C52	45.8
C54	33.7
C56	1.8
C58	0.3

The different products were evaluated for the occurrence of bloom by visualization and the chocolate coatings were analyzed for carbon numbers, giving a good indication that the (H_2M + M_2H) level was above 0.5 wt.%. The results based on the total fat are laid down in Tables 3 and 4.

TABLE 3

Occurrence of bloom (in weeks)		
Hardstock	Storage at 20 ° C	Storage at 23 ° C
1	6	4
2	8	6
3	20	8

TABLE 4

Carbon number analysis of chocolate coating

C40-C46

After 30 weeks at 20°C

Hardstock	Time = 0	Time = 30
1	0.0	0.0
2	0.0	0.0
3	0.0	0.64

After 12 weeks at 23°C

Hardstock	Time = 0	Time = 12
1	0.0	0.0
2	0.0	0.0
3	0.0	0.63

So, the use of hardstock-3 (i.e. an interesterified mixture of PO-58 and PK-39) gives an extended resistance to blooming as compared with the use of hardstocks free from (H_2M + HM_2, i.e. from TG with C40 to C46).

II. A chocolate powder (CP) was made with the composition:

Icing sugar	55 wt.%
Cocoa powder N11N	20 wt.%
Cocoa butter	25 wt.%
Lecithin	0.4 wt.%

Chocolates were made according to the following recipe :

Sample I : 95 wt.% of CP + 5% of cocoa butter equivalent (about 70 wt.% of SOS);

Sample II: 95 wt.% of CP + 3%% of the same cocoa butter equivalent and 2% of a hardstock with I.V. = 1 and composition (in carbon numbers).

C_{30}-C_{38}	6.3
C_{40}	5.7
C_{42}	12.9
C_{44}	13.7
C_{46}	20.3
C_{48}	21.3
C_{50}	9.3
C_{52}	7.3
C_{54}	3.0

This meant therefore an (H_2M + M_2H) level in the hardstock of about 74 wt.%.

The chocolates were slab-tempered, the shells were moulded and filled with a peanut paste of the following composition:

Wet-fractionated shea stearin	9.1 wt.%
SMP	3.3 wt.%
Peanut paste	64.6 wt.%
Icing sugar	22 wt.%
Salt	0.5 wt.%

The samples were stored at 25 °C. After 1 month's storage at 25 °C, followed by 10 weeks' stabilization at 20 °C, the shells were analysed and evaluated.

Sample	(H_2M + M_2H) on coating	Bloom score *
1	trace	2
2	0.7	5

* 5 = perfect; 3 and lower = unacceptable

III. The filling as disclosed below was used. The recipe of the filling was :

Icing sugar	22.5 wt.%
Peanut paste	64.6 wt.%
Salt	0.5 wt.%
SMP	3.3 wt.%
Fat	9.1 wt.%

Fillings were made, applying different fats according to the following scheme :

1. Fat is the hardstock of Example II
2. Fat is shea stearin
3. Fat is groundnut oil
4. Fat is an olein fraction of an (H_2M + M_2H) fat with I.V. < 3 and the following composition :

C_{30}-C_{38}	43.4
C_{40}	13.6
C_{42}	17.6
C_{44}	9.8
C_{46}	7.6
C_{48}	5.0
C_{50}	1.9
C_{52}	1.1

5. Fat is palm kernel fat

These fillings were put into standard dark chocolate shells. The shells were analysed and evaluated after 10 weeks' storage at 20 ° C.

Sample	(H_2M + M_2H) level (on coating)	Bloom score of shell
1	0.53	5
2	trace	3
3	trace	2
4	0.7	5
5	0.1	2

IV. A hazelnut paste was made with the following composition:

Cocoa powder 10/12	5 wt.%
Palm oil olein	16.9 wt.%
SMP	7 wt.%
Hazelnut paste (= blend of crushed hazelnut and icing sugar 1:1)	36 wt.%
Icing sugar	28 wt.%
Lecithin	0.4 wt.%
Fat	6.7 wt.%

Different fats were added to the hazelnut paste. The fillings were placed in standard dark chocolate shells and stored at 13 ° C for 3 months, followed by 10 weeks' storage at 20 ° C.

The following fats were used in the fillings :

1. Palm oil olein
2. The hardstock of Example II
3. An interesterified mixture of 70% palm kernel olein-42 and palm oil-58 with an I.V. < 3 and the following carbon numbers :

C_{30}-C_{38}	17.9
C_{40}	10.1
C_{42}	15.5
C_{44}	11.8
C_{46}	14.1
C_{48}	13.8
C_{50}	6.3
C_{52}	5.7
C_{54}	3.2

4. The (H_2M + M_2H) olein fraction of Example III, 4.

The shells were analysed and evaluated after storage for 3 months at 13 ° C and 10 weeks at 20 ° C :

Sample	(H_2M + M_2H) level (on coating)	Bloom score of shell
1	trace	2
2	0.63	5
3	0.5	4/5
4	0.59	4/5

V A peanut paste having the composition given below was applied. Different fats were added to this paste (see below). Fillings were made and placed in dark chocolate shells. These shells were stored at 20 ° C.

Cocoa powder 10/12	5 wt.%
Palm oil olein	22.2 wt.%
SMP	7 wt.%
Peanut paste	15 wt.%
Icing sugar	43 wt.%
Lecithin	0.4 wt.%
Salt	0.1 wt.%
Fat	7.8 wt.%

The following fillings were made by using the fats mentioned below :

1. Groundnut oil
2. The hardstock of Example II
3. The interesterified mixture of Example IV, 3.
4. The olein fraction of Example III, 4.

The shells were analysed and evaluated after 3 months' storage at 20 ° C.

Sample	(H_2M + M_2H) level (on coating)	Bloom score of shell
1	trace	3
2	0.7	5
3	0.5	5
4	0.73	5

VI. Biscuits were made by using the following recipe :

Fat	29.75 wt.5
Water	5.25 wt.%
Bastard sugar	22.0 wt.%
Eggs	2.0 wt.%
Flour	41.0 wt.%
Salt	0.3 wt.%

After mixing the fat with water, the sugar, eggs, flour and salt were added to the mixture. The resulting dough was stored at 6 ° C for 24 hours. The dough was rolled and cut into pieces of 1 cm x 2.5 cm. The biscuits were baked at 175 ° C for 20 minutes.

Two sets of biscuits were made, using the following fats:

Sample 1 : Hardened palm oil olein-37/wet-fractionated palm oil olein 80/20 w/w

Sample 2 : HS-3 (see Table 2)/ wet-fractionated palm oil olein 25/75 w/w

Both sets of biscuits were enrobed, using the chocolate composition : 95 wt.% of CP + 5 wt.% of cocoa butter equivalent (having about 70% SOS).

The results are given below. The bloom was evaluated after storage at 25 ° C.

The (H_2M + M_2H) level of the coating was analysed after 10 weeks' storage at 20 ° C.

Sample	Time taken to bloom at 25 ° C storage	(H_2M + M_2H) level on coating
1	4 weeks	trace
2	8 weeks	0.8

VII. Two sets of biscuits were made as set out in Example VI. The fat used in both cases was the fat of sample 1 of Example VI.

The biscuits were enrobed in the usual way, using the following compositions as chocolate :

Sample 1 : 95 wt.% of CP + 5 wt.% of cocoa butter equivalent (about 70% SOS)

Sample 2 : 95 wt.% of CP + 3 wt.% of the same CBE + 2 wt.% of HS-3 (see Table 2).

The products were evaluated for the appearance of bloom after a 24 hours' cycle at 15/25 ° C on

storage. The (H_2M + M_2H) level in the coating was analysed after 10 weeks at 20 ° C.

Results

Sample	Time to bloom at 15/25 ° C storage	(H_2M + M_2H) level on coating
1	4 weeks	trace
2	8 weeks	0.92

Claims

1. Chocolate-encapsulated filling consisting of at least a filling and a chocolate coating, wherein the filling comprises conventional filling ingredients and at least some amount, preferably at least 10 wt.%, of a filling fat, including optionally hardstock components, which product is characterized by the presence of such an amount of (H_2M + HM_2)-fat having a stearic acid content of at least 5 wt.%, and preferably having an iodine value of less than 20, as hardstock in the encapsulated product that the coating displays an (H_2M + HM_2)-content after storage for 10 weeks at 20 ° C of at least 0.5 wt.% and an SOS content of at least 15 wt.%, in which :
   H means saturated fatty acid with ≥ C16, preferably C_{16}-C_{18};
   M means saturated fatty acid with C8/C_{14}, preferably C_{12}-C_{14};
   S means saturated fatty acid with C_{16}/C_{18}; O means oleic acid.

2. Encapsulated filling according to Claim 1, wherein the (H_2M + HM_2)-content in the coating after 10 weeks' storage at 20 ° C is at least 0.6 wt.%, preferably 0.6-1.2 wt.%.

3. Encapsulated filling according to Claim 1, wherein the (H_2M + HM_2)-containing hardstock is originally part of the fat component of the filling.

4. Encapsulated filling according to Claim 3, wherein the (H_2M + HM_2)-content of the filling is 0.5-25 wt.%.

5. Encapsulated filling according to claim 1, wherein the (H_2M + HM_2)-containing hardstock is part of the coating.

6. Encapsulated filling according to Claim 1, wherein the (H_2M + HM_2) hardstock is present both in the filling and in the coating.

7. Encapsulated filling according to Claims 1-6, wherein the (H_2M + HM_2)-containing hardstock is an interesterified mixture of a vegetable oil high in triglycerides with fatty acid residues having at least 16 C atoms and a vegetable triglyceride rich in lauric and/or myristic acid residues.

8. Encapsulated filling according to Claim 7, wherein the hardstock is an interesterified mixture of hardened palm oil and hardened palm kernel oil.

9. Encapsulated filling according to Claim 8, wherein the hardstock is an interesterified mixture of PO-58 and PK-39 or fractions thereof.

10. Encapsulated filling according to Claims 1-9, wherein the chocolate coating is made of plain chocolate or milk chocolate.

11. Encapsulated fillings according to Claim 1, wherein the filling is selected from chocolate filling, praline filling, biscuits, cookies, toffees, fried food products and cakes.

12. Process for the preparation of encapsulated fillings with the composition of Claims 1-11, wherein the encapsulated products are made in a conventional way but wherein the (H_2M + HM_2)-containing hardstock is incorporated into the filling as part of the filling fat, whereupon the desired products are

obtained upon storage, because of migration of the (H_2M + HM_2)-component to the coating.

13. Use of an (H_2M + HM_2)-containing hardstock in encapsulated fillings, wherein the hardstock is used for the retardation of bloom of the chocolate coating.

14. Use of an (H_2M + HM_2)-containing hardstock in encapsulated fillings, wherein the hardstock is used as component of the fat of the filling in order to achieve a migration of this hardstock component to the chocolate coating upon storage.

15. Encapsulated chocolates, pralines, biscuits, cookies, toffees, fried food products, cakes, wherein the chocolate coating of the encapsulated product, after storage for 10 weeks at 20 °C, contains at least 0.5 wt.% of a (H_2M + HM_2) hardstock as defined in Claim 1.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 20 1848

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X,D	US-A-2 979 407 (WILLIAM N. DUCK) * column 2, line 29 - line 41 * * column 3, line 10 - line 19; claims 1-5 *	1-2,7-15	A23G1/00 A23G3/00 A21D13/08
X,D	US-A-3 491 677 (UMBERTO BRACCO) * column 2, line 3 - line 23 *	1-2,8, 10-15	
X,D	EP-A-0 390 408 (THE PROCTER & GAMBLE COMPANY) * column 2, line 10 - line 12 * * column 2, line 46 - line 50 * * column 3, line 45 - column 4, line 3 * * column 5, line 27 - column 7, line 39 *	1,7, 12-13	
X	WORLD PATENTS INDEX Week 7130, Derwent Publications Ltd., London, GB; AN 71-50354S (30) & JP-B-46 026 824 (ASAHI ELECTRO-CHEMICAL CO.) 1971 * abstract *	1,13	
A D	EP-A-0 089 082 (UNILEVER NV) * the whole document * & AU-A-1 234 683	1	A23G A21D

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	14 SEPTEMBER 1992	ALVAREZ ALVAREZ C.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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